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Exhibit R-2, PB 2010 Air Force RDT&E Budget Item Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 3600 - Research, Development, Test & Evaluation, Air Force/BA 3 - Advanced Technology Development (ATD)					R-1 ITEM NOMENCLATURE PE 0603112F Advanced Materials for Weapon Systems					
COST (\$ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	61.166	62.676	37.901						Continuing	Continuing
632100: Laser Hardened Materials	22.835	24.087	24.278						Continuing	Continuing
633153: Non-Destructive Inspection Development	7.709	8.163	1.655						Continuing	Continuing
633946: Materials Transition	11.040	15.936	9.582						Continuing	Continuing
634918: Deployed Air Base Demonstrations	13.760	11.287	2.386						Continuing	Continuing
6377SP: Advanced Space Materials	5.822	3.203	0.000						Continuing	Continuing
Note Note: FY 2008 funding totals include \$5.437 million in supplemental funding. In FY 2010, funds from Project 77SP have been moved to Project 2100 within this Program Element to more accurately align efforts.										
A. Mission Description and Budget Item Justification This program develops and demonstrates materials technology for transition into Air Force systems. The program has five projects which develop: (1) hardened materials technologies for the protection of aircrews and sensors; (2) non-destructive inspection and evaluation technologies; (3) transition data on structural and non-structural materials for aerospace applications; (4) airbase operations technologies including deployable base infrastructure, force protection, and fire fighting capabilities; and (5) advanced materials for space applications. This program is in Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for existing system upgrades and/or new system developments that have military utility and address warfighter needs.										

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3600 - Research, Development, Test & Evaluation, Air Force/BA 3 - Advanced Technology Development (ATD)		PE 0603112F Advanced Materials for Weapon Systems		
B. Program Change Summary (\$ in Millions)				
	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	54.871	41.926	45.030	
Current BES/President's Budget	61.166	62.676	37.901	
Total Adjustments	6.295	20.750	0.000	
Congressional Program Reductions	0.000	0.000		
Congressional Rescissions	0.000	-0.170		
Total Congressional Increases	5.437	23.720		
Total Reprogrammings	2.090	-2.800		
SBIR/STTR Transfer	-1.232	0.000		
Change Summary Explanation				
In FY 2009, Congress added \$2.72 million for EMI Grid Fabrication Technology, \$2.4 million for Aircraft Evaluation Readiness Initiative (AERI), \$0.8 million for Materials Integrity Management Research for Air Force Systems, \$4.0 million for Metals Affordability Initiative, \$2.4 million for Sewage-Derived Biofuels Project, \$4.8 million for Silicon Carbide Electronics Material Producibility Initiative, \$0.8 million for Sonic Infrared Imaging Technology Development, \$1.0 million for Strategic Biofuel Supply Program, and \$2.0 million for Body Armor Improved Ballistic Protection.				
C. Performance Metrics				
Under Development.				

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APPROPRIATION/BUDGET ACTIVITY 3600 - Research, Development, Test & Evaluation, Air Force/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603112F Advanced Materials for Weapon Systems					PROJECT NUMBER 632100	
COST (\$ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
632100: Laser Hardened Materials	22.835	24.087	24.278						Continuing	Continuing

Note
Note: Funds from Project 77SP have been moved to Project 2100 within this Program Element to more accurately align efforts.

A. Mission Description and Budget Item Justification
This project develops and demonstrates advanced materials technologies that enhance protection for Air Force aircrews to ensure safety and to enable aircrews to perform required missions in threat environments. Advanced materials technologies are also developed and demonstrated to enhance protection for Air Force sensor systems to ensure safety, survivability, and operability in threat environments.

B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
<p>MAJOR THRUST: Develop and demonstrate advanced materials technologies that enhance hardening for sensors, avionics, and components to increase survivability and mission effectiveness of aerospace systems. Note: The increase in funding in FY 2010 is a result of funds being moved from Project 77SP to better align efforts.</p> <p>In FY 2008: Demonstrated mature hardening materials technology for an Air Force tactical system. Characterized and incorporated candidate dual band limiter materials for tactical systems. Demonstrated protection strategies for large format charge coupled devices (CCD).</p> <p>In FY 2009: Transition mature hardening materials technology for an Air Force tactical system. Demonstrate performance of dual band limiter materials in tactical systems.</p> <p>In FY 2010: Investigate performance of dual band limiter materials in tactical systems. Demonstrate protection strategies for large format multi-chip CCDs. Fabricate and demonstrate solid state limiter and filter technology for protection of space systems. Evaluate materials survivability for space environments. Analyze the effect of laser energy on optical materials and electro-optical sensors and space structural materials.</p>	17.665	17.834	20.111	

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
<p>MAJOR THRUST: Develop and demonstrate advanced materials technologies that enhance protection for Air Force aircrews to ensure safety and to enable aircrews to perform required missions in a threat environment.</p> <p>In FY 2008: Validated performance of state-of-the-art agile filters and optical power limiters in a system configuration. Optimized agile filter and optical limiter devices for Air Force applications.</p> <p>In FY 2009: Transition advanced agile filters and optical power limiters technologies in a system configuration. Demonstrate agile filter and optical limiter devices for Air Force applications.</p> <p>In FY 2010: Integrate fixed optical coatings within visor applications for demonstration.</p>	5.170	6.253	4.167	

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C. Other Program Funding Summary (\$ in Millions)										
	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
Activity Not Provided/ Related Activities:	0.000	0.000							Continuing	Continuing
PE 0602102F/ Materials.	0.000	0.000							Continuing	Continuing
PE 0602202F/ Human Effectiveness Applied Research.	0.000	0.000							Continuing	Continuing
PE 0603231F/ Crew Systems and Personnel Protection Technology.	0.000	0.000							Continuing	Continuing
PE 0604706F/ Life Support Systems.	0.000	0.000							Continuing	Continuing
Activity Not Provided/ This project has been coordinated through the Tri-Service Laser Hardened Materials and Structures Gr	0.000	0.000							Continuing	Continuing
Activity Not Provided/ This project has been coordinated through the Reliance 21 process to harmonize efforts and eliminate	0.000	0.000							Continuing	Continuing
D. Acquisition Strategy										
Not Applicable.										

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COST (\$ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
633153: Non-Destructive Inspection Development	7.709	8.163	1.655						Continuing	Continuing
A. Mission Description and Budget Item Justification This project develops and demonstrates advanced nondestructive inspection/evaluation (NDI/E) technologies to monitor performance integrity and to detect failure causing conditions in weapon systems components and materials. NDI/E capabilities greatly influence and/or limit many design, manufacturing, and maintenance practices. This project provides technology to satisfy Air Force requirements to extend the lifetime of current systems through increased reliability and cost-effectiveness at field and depot maintenance levels. Equally important is assuring manufacturing quality, integrity, and safety requirements.										
B. Accomplishments/Planned Program (\$ in Millions)							FY 2008	FY 2009	FY 2010	FY 2011
MAJOR THRUST: Develop and demonstrate advanced technologies to improve capabilities to inspect for cracks and other damage to extend the total safe life of turbine engines. In FY 2008: Developed NDI/E approaches to extend the life of fracture-critical gas turbine engine components. In FY 2009: Demonstrate NDI/E approaches to extend the life of fracture-critical gas turbine engine components. In FY 2010: Validate NDI/E approaches to extend the life of fracture-critical gas turbine engine components.							0.530	0.527	0.200	
MAJOR THRUST: Develop and demonstrate advanced inspection technologies supporting low-observable (LO) systems to enhance affordability and ensure full performance and survivability. In FY 2008: Developed and demonstrated multiuse, multiplatform LO NDI/E hand tool that meets user requirements. In FY 2009: Develop and demonstrate a multiuse, multiplatform LO NDI/E hand tool that meets user requirements.							0.291	0.339	0.786	

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B. Accomplishments/Planned Program (\$ in Millions)			FY 2008	FY 2009	FY 2010
In FY 2010: Transition a common, multiuse, multiplatform, handheld LO NDI/E point inspection tool/sensor system.					
<p>MAJOR THRUST: Develop and demonstrate advanced technologies for improved capabilities in materials corrosion, fatigue monitoring, and testing of aging aircraft to reduce operations and maintenance costs. These technologies will contribute to full operability and safety of the aircraft fleet. Note: In FY 2009, this effort terminates due to higher Air Force priorities.</p> <p>In FY 2008: Validated NDI/E technologies to meet emerging inspection requirements for aging aircraft and develop processes.</p> <p>In FY 2009: Transition application-focused NDI/E technologies to meet emerging inspection requirements for aging aircraft.</p> <p>In FY 2010: Not Applicable.</p>			1.780	1.727	0.000
<p>MAJOR THRUST: Develop and demonstrate advanced systems status monitoring technologies to provide on-board and embedded sensing to gain continuous awareness of the state of key subsystems.</p> <p>In FY 2008: Developed optimal sensing approaches for real-time health monitoring of high-temperature protection systems and characterized power scavenging and signal transmission issues. Developed improved, smaller smart sensor technologies for wiring health analysis. Developed data fusion to be used with field-level inspection tools for assessing the structural health of airframes.</p> <p>In FY 2009: Develop optimal sensing approaches for real-time health monitoring of high-temperature protection systems and characterize power scavenging and signal transmission issues. Transition smart</p>			1.515	1.580	0.669

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B. Accomplishments/Planned Program (\$ in Millions)			FY 2008	FY 2009	FY 2010
<p>sensor technologies for wiring health analysis. Transition total field-level inspection tool for assessing the structural health of airframes.</p> <p>In FY 2010: Develop and demonstrate optimal sensing approaches for real-time health monitoring of high-temperature protection and advanced material systems and characterize power scavenging and signal transmission issues. Validate smart sensor technologies for wiring health analysis. Validate field- and depot-level inspection tools for assessing the structural health of airframes.</p>					
<p>CONGRESSIONAL ADD: Aircraft Evaluation Readiness Initiative (AERI).</p> <p>In FY 2008: Conducted Congressionally-directed effort for AERI.</p> <p>In FY 2009: Conduct Congressionally-directed effort for AERI.</p> <p>In FY 2010: Not Applicable.</p>			1.942	2.394	0.000
<p>CONGRESSIONAL ADD: Continuous Integrated Vehicle Health Monitoring System.</p> <p>In FY 2008: Conducted Congressionally-directed effort for Continuous Integrated Vehicle Health Monitoring System.</p> <p>In FY 2009: Not Applicable.</p> <p>In FY 2010: Not Applicable.</p>			1.165	0.000	0.000
<p>CONGRESSIONAL ADD: Materials Integrity Management Research for Air Force Systems.</p> <p>In FY 2008: Conducted Congressionally-directed effort for Materials Integrity Management Research.</p>			0.486	0.798	0.000

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B. Accomplishments/Planned Program (\$ in Millions)							FY 2008	FY 2009	FY 2010	FY 2011
In FY 2009: Conduct Congressionally-directed effort for Materials Integrity Management Research for Air Force Systems. In FY 2010: Not Applicable.										
CONGRESSIONAL ADD: Sonic Infrared Imaging Technology Development. In FY 2008: Not Applicable. In FY 2009: Conduct Congressionally-directed effort for Sonic Infrared Imaging Technology Development. In FY 2010: Not Applicable.							0.000	0.798	0.000	
C. Other Program Funding Summary (\$ in Millions)										
	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
Activity Not Provided/ Related Activities:	0.000	0.000							Continuing	Continuing
PE 0602102F/ Materials.	0.000	0.000							Continuing	Continuing
Activity Not Provided/ This project has been coordinated through the Reliance 21 process to harmonize efforts and eliminate	0.000	0.000							Continuing	Continuing
D. Acquisition Strategy Not Applicable.										

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E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.		

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COST (\$ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
633946: Materials Transition	11.040	15.936	9.582						Continuing	Continuing
A. Mission Description and Budget Item Justification This project develops and demonstrates advanced materials and processing technologies for fielded and planned Air Force weapon, airframe, and propulsion applications. Advanced materials and processes that have matured beyond applied research are characterized, critical data are collected, and critical evaluations in the proposed operating environment are performed. These design and scale-up data improve the overall affordability of promising materials and processing technologies, providing needed initial incentives for their industrial development.										
B. Accomplishments/Planned Program (\$ in Millions)							FY 2008	FY 2009	FY 2010	FY 2011
<p>MAJOR THRUST: Develop and demonstrate advanced materials and processing technologies for air vehicles and subsystems to enhance the lift, propulsion, low-observable performance, power generation/management, and overall affordability of air vehicles.</p> <p>In FY 2008: Validated materials-damage predictive approaches for engine health determination and life extension capability. Transitioned advanced materials and materials process capabilities for component-level demonstrations of power generation materials for airborne directed energy weapons. Transitioned materials and processing concepts for component-level demonstrations of new material for enabling mid-IR laser output with energy sufficient for enabling new aircraft self-protection schemes. Transitioned flexible/lightweight conductive gap filler. Validated advanced materials and processing technologies for transition to fielded and planned Air Force weapon, airframe, and propulsion applications as well as support systems including Air Force Materiel Command (AFMC) center infrastructure.</p> <p>In FY 2009: Validate materials-damage predictive approaches for engine health determination and life extension capability. Transition advanced materials and processing technologies to fielded and planned Air Force weapon, airframe, and propulsion applications as well as support systems including AFMC center infrastructure. Evaluate domestic lithium ion precursor materials, active materials, associated testing, and battery-cell manufacturing for acceleration of industrial development.</p>							3.442	3.335	3.140	

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011	
In FY 2010: Refine processes for producing large area, high-quality diamond windows for airborne high power microwave directed energy weapons. Initially develop nanostructured materials using multiple approaches for high energy density capacitors for pulsed power applications. Transition and validate the methodology to characterize LO materials during production for process control and process validation.					
<p>MAJOR THRUST: Develop and demonstrate advanced materials and processing technologies to enhance the sustainability of Air Force aerospace systems by lowering operations and maintenance costs and ensuring the full operability and safety of systems and personnel. Note: Increase in FY 2010 is due to increased emphasis in composites technology.</p> <p>In FY 2008: Identified and prioritized critical issues that are preventing transition of emerging materials and processes for sustainment of Air Force systems.</p> <p>In FY 2009: Develop test methodologies and evaluation techniques to facilitate transition of emerging materials and processes for sustainment of Air Force systems.</p> <p>In FY 2010: Demonstrate innovative technologies for bare base utilities. Develop new design and manufacturing processes to achieve dramatic reductions in nonrecurring fabrication and assembly tooling costs and schedules for composite and metallic aircraft utilizing bonded structures and friction stir welding.</p>	0.218	1.112	4.442		
<p>MAJOR THRUST: Develop and demonstrate practical, affordable, and novel high temperature materials, structures, and thermal management concepts to enable future defense capabilities for prompt global strike concepts including advanced hypersonic weapon, high mach missiles, global strike missiles, hypervelocity flight vehicles and propulsion systems, and hypervelocity weapons. Note: The breakout of funding in FY 2010 and out is a result of increased emphasis in high temperature materials.</p> <p>In FY 2008: Not Applicable.</p>	0.000	0.000	2.000		

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY 2009: Not Applicable. In FY 2010: Identify key issues and structural concepts for hot structure and thermal protection systems to be fabricated from advanced ceramics, ceramic matrix composites, hybrids, and advanced metals and intermetallics.				
CONGRESSIONAL ADD: Metals Affordability Initiative. In FY 2008: Conducted Congressionally-directed effort for Metals Affordability Initiative. In FY 2009: Conduct Congressionally-directed effort for Metals Affordability Initiative. In FY 2010: Not Applicable.	4.856	3.989	0.000	
CONGRESSIONAL ADD: Coated Field Repair (2K Gun). In FY 2008: Conducted Congressionally-directed effort for Coated Field Repair (2K Gun). In FY 2009: Not Applicable. In FY 2010: Not Applicable.	0.971	0.000	0.000	
CONGRESSIONAL ADD: EMI Grid Fabrication Technology. In FY 2008: Conducted Congressionally-directed effort for EMI Grid Fabrication Technology.	1.553	2.713	0.000	

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY 2009: Conduct Congressionally-directed effort for EMI Grid Fabrication Technology. In FY 2010: Not Applicable.				
CONGRESSIONAL ADD: Silicon Carbide Electronics Material Producibility Initiative. In FY 2008: Not Applicable. In FY 2009: Conduct Congressionally-directed effort for Silicon Carbide Electronics Material Producibility Initiative. In FY 2010: Not Applicable.	0.000	4.787	0.000	

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C. Other Program Funding Summary (\$ in Millions)										
	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
Activity Not Provided/ Related Activities:	0.000	0.000							Continuing	Continuing
PE 0602102F/ Materials.	0.000	0.000							Continuing	Continuing
PE 0603203F/ Advanced Aerospace Sensors.	0.000	0.000							Continuing	Continuing
PE 0603211F/ Aerospace Technology Dev/Demo.	0.000	0.000							Continuing	Continuing
PE 0603216F/ Aerospace Propulsion and Power Technology.	0.000	0.000							Continuing	Continuing
Activity Not Provided/ This project has been coordinated through the Reliance 21 process to harmonize efforts and eliminate	0.000	0.000							Continuing	Continuing
D. Acquisition Strategy Not Applicable.										
E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.										

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COST (\$ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
634918: Deployed Air Base Demonstrations	13.760	11.287	2.386						Continuing	Continuing
Note Note: FY 2008 funding totals include \$5.437 million in supplemental funding.										
A. Mission Description and Budget Item Justification This project develops and demonstrates advanced, rapidly deployable airbase technologies that reduce airlift and manpower requirements, setup times, and sustainment costs, and improve protection and survivability of deployed Air Expeditionary Force (AEF) warfighters. Affordable, efficient technologies are developed and demonstrated to provide deployable infrastructure, advanced weapon system support, force protection, and fire fighting capability for deployed AEF operations.										
B. Accomplishments/Planned Program (\$ in Millions)							FY 2008	FY 2009	FY 2010	FY 2011
MAJOR THRUST: Demonstrate and transition advanced deployable airbase technologies, including energy and aircraft operating surfaces, to reduce airlift and manpower requirements, setup times, and sustainment costs in support of AEF operations, while providing independence from host nation energy, utilities, and infrastructure. Note: In FY 2009, this effort increases emphasis on airfield damage repair technologies.							1.729	4.379	1.157	
In FY 2008: Developed transition plan and specifications for system development and demonstration. Characterized catalytic and surface chemistry technologies for application to bare base utilities. Developed and demonstrated continuous load deflection technologies and improved crater/spall repair.										
In FY 2009: Develop best methods for integration of advanced power generation and distribution. Characterize and ensure processes for innovative technologies. Begin development and demonstration of airfield damage repair and matting technologies that address field critical conditions, represented by key performance parameters, including issues like reduced weight and ease of installation and repair in the field.										
In FY 2010: Demonstrate and transition methods for integrated, advanced power generation and distribution. Demonstrate methods and technologies for performing aircraft operating surface evaluations for ability to										

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sustain aircraft operations. Demonstrate and analyze rapid temporary and permanent high temperature operating surface repairs.				
<p>MAJOR THRUST: Demonstrate and transition affordable, efficient technologies to provide force protection and fire fighting capability for deployed AEF operations.</p> <p>In FY 2008: Developed and analyzed effectiveness of improved blast suppression technologies and fragmentation protection materials for new and existing structures. Demonstrated explosives detection technologies. Transitioned technical orders and construction standards supporting fire suppression technologies for fire fighter safety technologies. Evaluated ultrahigh pressure, standoff nozzles, and other innovative technologies with test bed vehicles. Developed air filtration and model/evaluate reactive filtration effectiveness for expeditionary structures.</p> <p>In FY 2009: Validate and fabricate improved blast suppression technologies and fragmentation protection materials for new and existing structures. Demonstrate and validate explosives detection technologies. Evaluate and characterize improved fire fighter safety technologies and transition technology to operational units. Characterize and analyze/evaluate ultrahigh pressure, standoff nozzles, and other innovative technologies with test bed vehicles. Characterize air filtration and model/evaluate reactive filtration effectiveness for expeditionary structures.</p> <p>In FY 2010: Demonstrate agile and lightweight adaptive blast suppression materials in representative structures. Integrate and demonstrate candidate fire fighter safety technologies against representative environments and threats. Integrate and demonstrate candidate ultrahigh pressure, nozzles, and other technologies in fire safety systems. Demonstrate air filtration and reactive filtration effectiveness for expeditionary structures and personnel protection.</p>	2.517	1.523	1.229	
CONGRESSIONAL ADD: Body Armor Improved Ballistic Protection.	1.553	1.995	0.000	

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B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY 2008: Conducted Congressionally-directed effort for Body Armor Improved Ballistic Protection. In FY 2009: Conduct Congressionally-directed effort for Body Armor Improved Ballistic Protection. In FY 2010: Not Applicable.				
CONGRESSIONAL ADD: Encapsulated Ballistic Protection System (EBPS). In FY 2008: Conducted Congressionally-directed effort for EBPS. In FY 2009: Not Applicable. In FY 2010: Not Applicable.	0.971	0.000	0.000	
CONGRESSIONAL ADD: Strategic Biofuel Supply Program. In FY 2008: Conducted Congressionally-directed effort for Strategic Bio-fuels Supply Program. In FY 2009: Conduct Congressionally-directed effort for Strategic Biofuel Supply Program. In FY 2010: Not Applicable.	1.553	0.997	0.000	
MAJOR THRUST: Airfield Damage Repair (ADR). In FY 2008 GWOT: Developed technologies to maintain and repair CENTAF runways to support increased aircraft traffic and heavy loads. Technologies included pelletization repair of asphalt pavements; advanced	2.580	0.000	0.000	

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Exhibit R-2a, PB 2010 Air Force RDT&E Project Justification			DATE: May 2009	
APPROPRIATION/BUDGET ACTIVITY 3600 - Research, Development, Test & Evaluation, Air Force/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603112F Advanced Materials for Weapon Systems		PROJECT NUMBER 634918	
B. Accomplishments/Planned Program (\$ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
<p>spall repair methods, equipment testing, and certification; asphalt material field tests; and automated ADR assessment tool development. These efforts minimized runway repair time and airfield downtime. Delivered to our deployed civil engineer warfighters (1) advanced/aircraft-certified pavement repair materials (rapid-set); more durable/effective in hot/austere environments; and (2) improved tactics, techniques, and procedures for repairing Soviet-designed airfields.</p> <p>In FY 2009: Not Applicable.</p> <p>In FY 2010: Not Applicable.</p>				
<p>MAJOR THRUST: Counter-Improvised Explosive Device (C-IED) - Sniper-Protected Robotics Operation.</p> <p>In FY 2008 GWOT: Developed sniper-protected capability to transport, employ, control, and recover explosive ordnance disposal (EOD) robots, which allowed EOD forces to deploy and operate C-IED equipment from the safety of their armored response vehicles. Current dismounted operations consistently expose EOD personnel to enemy sniper fire and related threats.</p> <p>In FY 2009: Not Applicable.</p> <p>In FY 2010: Not Applicable.</p>	2.857	0.000	0.000	
<p>CONGRESSIONAL ADD: Sewage-Derived Biofuels Project.</p> <p>In FY 2008: Not Applicable.</p> <p>In FY 2009: Conduct Congressionally-directed effort for Sewage-Derived Biofuels Project.</p> <p>In FY 2010: Not Applicable.</p>	0.000	2.393	0.000	

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B. Accomplishments/Planned Program (\$ in Millions)								FY 2008	FY 2009	FY 2010	FY 2011
C. Other Program Funding Summary (\$ in Millions)											
	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost	
Activity Not Provided/ Related Activities:	0.000	0.000							Continuing	Continuing	
PE 0602102F/ Materials.	0.000	0.000							Continuing	Continuing	
PE 0603287F/ Physical Security Equipment.	0.000	0.000							Continuing	Continuing	
PE 0604617F/ Agile Combat Support.	0.000	0.000							Continuing	Continuing	
Activity Not Provided/ This project has been coordinated through the Reliance 21 process to harmonize efforts and eliminate	0.000	0.000							Continuing	Continuing	
D. Acquisition Strategy Not Applicable.											
E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.											

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Exhibit R-2a, PB 2010 Air Force RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 3600 - Research, Development, Test & Evaluation, Air Force/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603112F Advanced Materials for Weapon Systems					PROJECT NUMBER 6377SP	
COST (\$ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
6377SP: Advanced Space Materials	5.822	3.203	0.000						Continuing	Continuing

Note

Note: Funds from Project 77SP have been moved to Project 2100 within this Program Element to more accurately align efforts.

A. Mission Description and Budget Item Justification

This project develops and demonstrates materials and processing technologies for transition into Air Force space systems. Materials and processes development is scaled up to the appropriate level to demonstrate materials capability in the relative environment. Sub-scale components and nonstructural material components are developed and demonstrated to validate expected materials characteristics. Critical data on both structural and nonstructural materials is developed and provided for engineering and system design decisions. Laser hardened materials technologies are developed, demonstrated, and transitioned for the broadband protection of space sensors from a variety of laser threats. Reducing risk in materials technology improves the affordability, reliability, survivability, and operational performance of current and future space systems.

B. Accomplishments/Planned Program (\$ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
MAJOR THRUST: Develop and demonstrate advanced materials and processing technologies to enable revolutionary improvements in the performance of air-breathing and rocket-based aerospace vehicles and weapons.	2.691	1.496	0.000	
In FY 2008: Refined developed materials formulations and approaches for thermal protection systems and aeroshells that provide solutions for cost-effective scale-up, fabrication, and integration techniques. Validated performance of high temperature composites on integrated cryogenic tanks and hypersonic structures, demonstrating low cost component fabrication and scale-up of design and process methodologies.				
In FY 2009: Utilizing newly developed materials approaches, fabricate thermal protection system sub-components for high temperature testing. Develop a sub-component cryogenic tank article and demonstrate the integration of ceramic, metallic, and carbon-carbon thermal protection system components.				
In FY 2010: Not Applicable.				

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B. Accomplishments/Planned Program (\$ in Millions)				FY 2008	FY 2009	FY 2010	FY 2011			
<p>MAJOR THRUST: Develop and demonstrate advanced materials technologies that enhance hardening for space systems.</p> <p>In FY 2008: Optimized and validated limiter and filter technology for protection against low and high power lasers. Analyzed laser phenomenology for intrinsic hardening solutions to jamming and damage susceptibility in electro-optical sensors.</p> <p>In FY 2009: Fabricate and demonstrate limiter and filter technology for protection of space systems. Investigate impact of inserting state-of-the-art filters and optical power limiters into a realistic system configuration.</p> <p>In FY 2010: Not Applicable.</p>				3.131	1.707	0.000				
C. Other Program Funding Summary (\$ in Millions)										
	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
Activity Not Provided/Not Applicable.	0.000	0.000							Continuing	Continuing
D. Acquisition Strategy										
Not Applicable.										
E. Performance Metrics										
Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.										

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